

## EDITORIAL COMMENT†

### THE "SCOOP" AS A SOURCE OF BACTERIAL CONTAMINATION OF ICE CREAM

Routine sampling of market ice cream for bacteriological counts is generally an established health department procedure. The San Francisco ordinance regarding milk and ice cream has legally determined that ice cream, when sold by manufacturer, distributor or retailer, shall not contain nonpathogenic bacteria in excess of 50,000 per gram. The prevalence of higher bacterial counts, however, in market ice creams in San Francisco made further investigation necessary as to all possible sources of contamination. Several sources were ascertained, but the most fruitful appeared to be the "scoop and its washings." It was the rule, rather than the exception, to find receptacles for the ice cream scoops to be infrequently cleaned throughout the day, the water intended for washing scoops unchanged, and chemical or other methods of sterilization rarely used. In the survey conducted, 487 samples of scoop washings were obtained for bacteriologic analysis. In 124, or approximately 25 per cent, the bacterial counts were under 10,000 cubic centimeters; 266 (or 54 per cent), over 100,000 bacteria per cubic centimeter; and 97, or approximately 20 per cent, over 1,000,000 bacteria per cubic centimeter. To obviate such high bacterial counts, a sanitary code for the use and cleansing of ice-cream scoops was promulgated. This code requires several daily washings of the scoop and its receptacle with soap and hot water; the frequent changing of water in the receptacle; the washing of the scoop in clean running water, preferably hot, before being used for service; and, finally, the avoidance of direct handling of the lower portion of the scoop by the attendant. The adoption of this sanitary code, the checking by bacterial sampling and examination and ordinary inspection, will serve to reduce materially this source of contamination of a universally used food.

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### DO ALIEN PROTEINS MULTIPLY IN THE ANIMAL BODY?

The possibility that certain antigens are autocatalytic colloids, capable of multiplying (or, of being multiplied), in symbiosis with animal tissues, is a speculative hypothesis now under serious consideration by immunologic theorists. The latest experimental evidence in support of this theory is a quasi-proliferation of tetanus toxin on intramuscular injection into rabbits or guinea pigs. Doctors Zuger and Friedemann,<sup>1</sup> of the Division of Bacteriology, Jewish Hospital, Brooklyn, for ex-

ample, noted that from ten to twenty times the calculated therapeutic dose of tetanus antitoxin was required to protect guinea pigs or rabbits if multiple lethal doses of tetanus toxin were injected intramuscularly, rather than intravenously, as in routine titrations. Thus, their standard dose (10 MLD) tetanus toxin injected intravenously, required but 0.00025 cubic centimeters, commercial antitoxin for complete neutralization. The same dose, however, given intramuscularly required ten times this dose, or 0.0025 cubic centimeters commercial antitoxin. They concluded from this observation that there is some hitherto unsuspected multiplication, activation, or "potentiation" of tetanus toxin in guinea pig muscles.

To test this conclusion 200 MLD tetanus toxin was ground up with five grains of exsanguinated guinea pig muscle. The resultant emulsion was centrifuged, and the supernatant fluid injected intramuscularly into guinea pigs, control injections being made with the same calculated dose of unaltered tetanus toxin. In their controls 1 cubic centimeter, 1:4000 dilution of unaltered tetanus toxin was the minimum lethal dose; the "muscle toxin," however, requiring but an eighth of this dose, or 1 cubic centimeter of a 1:32,000 dilution to produce the same lethal effects. The natural toxin, therefore, had apparently been increased eightfold in toxicity as a result of contact or symbiosis with muscle tissues. The "muscle toxin," however, was rapidly "depotentiated" on intravenous injection, and, thus tested, required only the usual amount of commercial antitoxin for complete neutralization.

Probably the simplest phenomenon of this type thus far studied by immunochemists is the four- to eightfold quasi-proliferation of proteins under the influence of certain relatively mild proteolytic enzymes. Dr. Harold C. Sox<sup>2</sup> of Stanford University, for example, mixed one volume horse serum with twenty volumes canine leucocytic extract. Titration of the mixture by means of anti-horse rabbit precipitins after eighteen hours' incubation gave readings suggesting a four- to eightfold *in vitro* multiplication of horse proteins. Doctor Sox's explanation of this apparent multiplication assumed that "under the influence of leucocytic proteolysin each horse protein molecule is hydrolysed into from four to eight daughter protein molecules, each daughter molecule being of approximate horse protein specificity." Doctor Sox subsequently demonstrated similar "depolymerization" or "symmetrical hydrolysis" of horse proteins on intravenous injection into dogs.

The apparent proliferation of alien (or denatured tissue), colloids of greatest current clinical interest, however, is the quasi-proliferation of *B. welchii* toxin, or the "formation of secondary hema-toxic products," on intratibial injection into rabbits. About ten years ago, Doctors Torrey and Kahn,<sup>3</sup> of Cornell Medical College, found that they could inject 0.5 cubic centimeter of a non-hemolytic *B. welchii* filtrate intravenously into rabbits without producing a very appreciable anemia. All animals

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<sup>1</sup> Zuger, Bernard, and Friedemann, Ulrich: Proc. Soc. Exper. Biol. and Med., 38:283 (Mar.), 1938.

<sup>2</sup> Sox, Harold C., et al.: Proc. Soc. Exper. Biol. and Med., 27:72, 1929; J. Immunol., 21:409, 1931.

<sup>3</sup> Torrey, John C., and Kahn, Morton C.: Am. J. Path., 5:117, 1929.

survived this injection. The same dose, however, injected into a single bone marrow (tibia) caused progressive degenerative changes in all bone marrows of the body, with ultimate death due to an anemia resembling pernicious anemia in man. This observation has been confirmed by Dr. S. D. Beard<sup>4</sup> and his associates of Pearl River, New York. Here tetanus toxin brought into symbiosis with bone marrow cells was apparently "potentiated" or otherwise changed to an organ-specific hormone of increased toxicity. This toxic hormone caused secondary degenerative lesions in all bone marrows of the body.

The theory that certain alien proteins (or denatured tissue proteins), are autocatalytic colloids, multiplying or being multiplied in symbiosis with living tissue cells, furnishes a plausible explanation for various phenomena of this type. This theory, however, is by no means the only plausible explanation of such phenomena, and must be subjected to much more critical study before its adoption in routine clinical logic. Thus far, the most convincing evidence in support of this theory is drawn from the environmental "transformations" of bacteria, environmentally induced bacteriophage, lysozyme, or carbohydrate specificity multiplying (or being multiplied), in symbiosis with bacterial cells. The reported work with tetanus and *B. welchi* toxins strongly suggest, but by no means prove, similar colloidal symbiotic processes in animal tissues.

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<sup>4</sup> Beard, S. D., Clark, G. W., and Moses, Max J.: *Proc. Soc. Exper. Biol. and Med.*, 26:13, 1928.

*Rabies: Report of Twelve Cases, with Discussion of Prophylaxis.*—Maurice L. Blatt, Samuel J. Hoffman, and Maurice Schneider, Chicago (*Journal of the American Medical Association*, August 20, 1938), discuss the twelve cases of rabies admitted to the Cook County Hospital between 1929 and 1937. All proved fatal. The diagnosis in each case was confirmed by necropsy. The incubation period for the patients varied from two weeks to two months. The closer the site of the bite to the central nervous system the shorter was the incubation period. Wounds made by the bites of animals should immediately be cauterized with nitric acid. The Pasteur treatment or one of its modifications should be instituted in accordance with rules outlined and accepted. The twelve persons whose cases are reported died after suffering great agony and might have been saved if adequate prophylactic measures had been instituted immediately. They were admitted to the hospital after having been ill from two to seven days and anywhere from two weeks to two months after they had been bitten by dogs. Stringent enforcement of regulations governing ownership, licensure, muzzling and leashing of dogs would have prevented the bites. The extent of this problem is evidenced by the fact that in the state of Illinois alone 18,466 dog bites were reported to the State Department of Public Health in 1936 and that there were ten deaths from rabies. A knowledge of similar facts would divulge a tremendous loss of time and of lives of human beings and animals in the United States from a preventable cause. When such knowledge becomes public it will be of inestimable educational value in the eradication of this dreadful malady.

## ORIGINAL ARTICLES

### INDUCTION OF LABOR: SOME DIFFICULTIES\*

By WILLIAM BENBOW THOMPSON, M.D.  
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DISCUSSION by Henry A. Stephenson, M.D., San Francisco; Donald G. Tollefson, M.D., Los Angeles; John W. Sherrick, M.D., Oakland.

IN April, 1931, Dr. J. Morris Slemmons<sup>1</sup> discussed "The Induction of Labor at Term" before the Los Angeles Obstetrical and Gynecological Society, and presented the results from 132 cases of rupturing the bag of waters in order to secure the onset of labor. In the same month, and stimulated by a prior enthusiastic letter from Doctor Slemmons to Dr. J. W. Williams, Guttmacher and Douglas<sup>2</sup> of Johns Hopkins reported 120 such inductions. With the evident approbation of the leaders of the conservative school, the method soon was widely adopted. Articles detailing the findings by Morton<sup>3</sup> of Lynch's Clinic with 150 cases, Vruwink of Los Angeles<sup>4</sup> with 128 cases, Stern<sup>5</sup> of Philadelphia with eighty-five cases, Plass and Seibert<sup>6</sup> of Iowa City with 681 cases, and Mathieu and Holman<sup>7</sup> of Portland with 750 cases, appeared in the literature. All of these papers admit occasional failures or difficulties, but the general impression to be gained from a casual reading is that the age-old problem of the obstetrical attendant of how best to promote shorter and easier labor is practically solved. Only a close and critical study reveals the pitfalls that would entrap the unskilled and unwary. Hence it seems worth while, at this time, to emphasize the unfortunate results lest a valuable and practical procedure fall into disrepute through inappropriate application.

#### METHOD OF SLEMONS

The method proposed by Slemmons was (1) castor oil, 2 ounces, with quinine, 10 grains; (2) four hours later rupture of the membranes; (3) intranasal application of a solution of pituitary extract until regular contractions were established. No one of these was an innovation. Castor oil and quinine as an "obstetrical cocktail" has a more or less honorable ancient history; Denman<sup>8</sup> in 1802 advocated rupture of membranes to institute labor; and Hofbauer<sup>9</sup> in 1927 suggested the nasal route for administering pituitary extract. The logical combination of these steps, however, appealed to Slemmons, and, despite various modifications, the method is essentially as he proposed. Guttmacher and Douglas found that, by omitting the pituitary extract, both the "latent period" before the onset of contractions and the labor itself were somewhat lengthened, while rupture of membranes alone, in two cases, prolonged the latent period to a dangerous degree. Morton suggested the vaginal instillation of 30 cubic centimeters of 4 per cent aqueous solution of mercurochrome as advocated by Mayes<sup>10</sup> for normal labor. Vruwink reduced the amount of quinine, reserved the pituitary ex-

\* Read before the Obstetrics and Gynecology Section of the California Medical Association at the sixty-seventh annual session, Pasadena, May 9-12, 1938.